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Solitary metastasis to the intercostal muscle from hepatocellular carcinoma: A case report

Katsuyoshi Furumoto[a,*], Koki Miura[b], Daisuke Nagashima[a], Hidenobu Kojima[a], Tomohiko Mori[a], Daisuke Ito[a], Kozo Kajimura[c], Masafumi Kogire[a]

[a] *Departments of Surgery, Kishiwada City Hospital, 1001 Gakuhara-cho, Kishiwada-shi, Osaka 596-8501, Japan*
[b] *Departments of Thoracic Surgery, Kishiwada City Hospital, 1001 Gakuhara-cho, Kishiwada-shi, Osaka 596-8501, Japan*
[c] *Departments of Gastroenterology, Kishiwada City Hospital, 1001 Gakuhara-cho, Kishiwada-shi, Osaka 596-8501, Japan*

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ABSTRACT

INTRODUCTION: Skeletal muscle metastases from carcinomas, especially to intercostal muscles, are rare. Most metastatic chest wall tumors from hepatocellular carcinoma (HCC) result from disseminations through needle tracts of intrahepatic HCC treatments.
PRESENTATION OF CASE: We report the case of a 65-year-old man with chronic viral hepatitis B whose intrahepatic lesions were stabilized by repeated radiofrequency ablations and transcatheter arterial chemoembolization. Follow-up computed tomography demonstrated a well-enhanced mass in the right chest wall. Because α-fetoprotein and des-γ-carboxy prothrombin levels were elevated and no other tumors were detected, we diagnosed the mass as an extrahepatic metastasis from the HCC and resected it along with the surrounding ribs. There was no involvement of the bone, pleura, and lung.
DISCUSSION: The tumor was microscopically diagnosed as an intercostal muscle tumor metastasized from HCC, which has not been documented previously. The resection rate of extrahepatic tumors of HCC is low in literature. No other apparent extrahepatic recurrence has been observed for more than 20 months after the surgery.
CONCLUSION: We report the case of HCC patient who underwent surgical resection of an intercostal muscle tumor that had metastasized from HCC. Pathological examination of the tumor revealed the tumor cells in the blood vessels, and we speculate it hematogeneous metastasis.

1. Introduction

Chest wall masses primarily result from infection or tumors,[1] and malignant chest wall tumors, especially those metastasized from hepatocellular carcinomas (HCCs), are uncommon. HCC is an aggressive tumor, the treatment of which depends on the extent of its spread; however, no specific guidelines exist for the treatment of extrahepatic metastatic lesions. We report here a case of an isolated metastasis in the 7th intercostal muscle of the right chest wall, which was detected after repeated radiofrequency ablations (RFA) and transcatheter arterial chemoembolization (TACE) for the intrahepatic HCC. Metastasis of any type of carcinoma to skeletal muscle is rare, and no previous reports have described the removal of intercostal muscle tumors metastasizing from HCC.

2. Presentation of case

A 65-year-old man with chronic viral hepatitis B and liver cirrhosis was referred to our outpatient clinic 3 years back for the treatment of a liver tumor diagnosed as HCC. The tumor was about 2 cm in diameter and was located in segment 8 (Fig. 1a). It was treated by RFA and TACE because the patient refused to undergo hepatectomy. Approximately 2 years later, a new lesion was detected in segment 5 (Fig. 1b). RFA was performed 7 times and TACE once and the intrahepatic tumors were controlled (Fig. 1c and d). Despite treatment, serum α-fetoprotein (AFP) and des-γ-carboxy prothrombin (PIVKA-II) levels increased to 47.4 ng/ml (normal range: ~7 ng/ml) and 600 mAU/ml (normal range: ~40 mAU/ml), respectively, and computed tomography (CT) examination revealed a right chest wall mass approximately 2.9 × 1.9 cm in size. It was heterogeneous and weakly enhanced in both early (arterial) and late phases (Fig. 2). The tumor was located away from the needle tract area of prior RFA treatment, and there was no pleural or pulmonary involvement. Although the patient did not notice the mass, physical examination revealed a hard, less mobile, and painless mass about 3 cm in diameter. No other lesions were detected on CT. We diagnosed the tumor as a solitary extrahepatic metastasis of the HCC and performed a radical

* Corresponding author at: Department of Surgery, Kishiwada City Hospital, 1001 Gakuhara-cho, Kishiwada-shi, Osaka 596-8501, Japan. Tel.: +81 72 445 1000; fax: +81 72 441 8812.
E-mail address: furupichi@uu.em-net.ne.jp (K. Furumoto).

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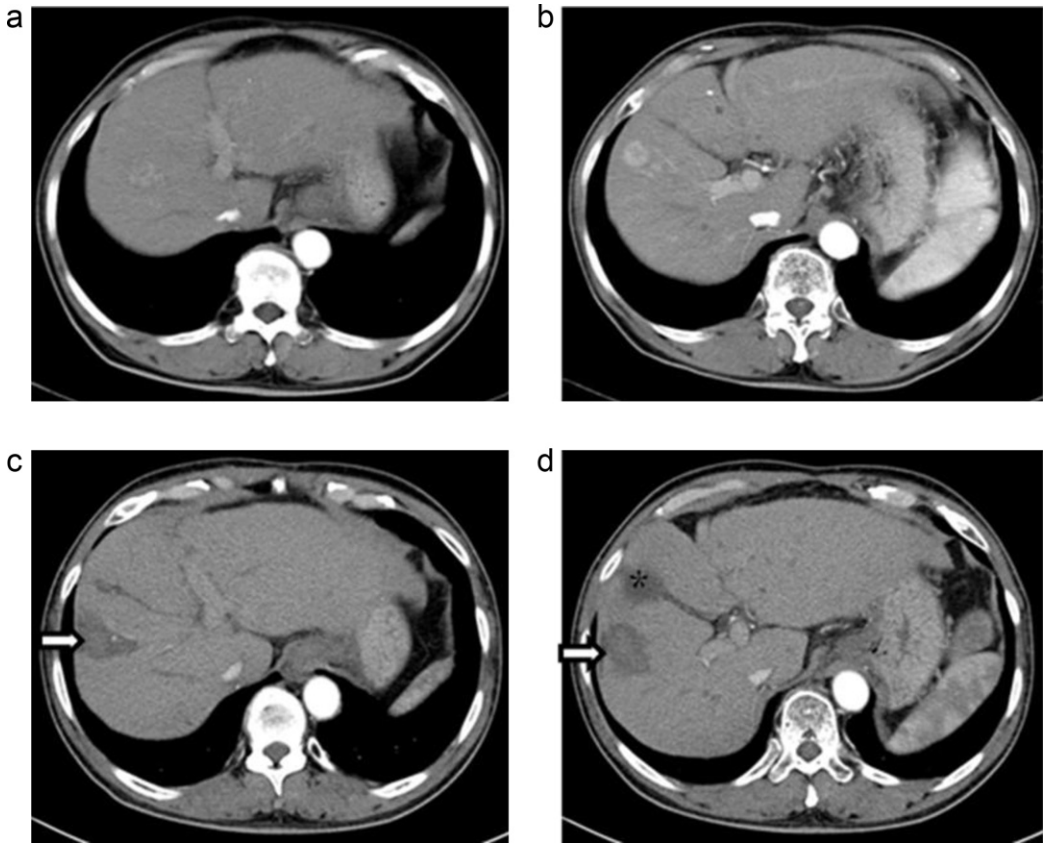

Fig. 1. Contrast-enhanced CT showed a well-enhanced tumor in segment 8 in an early phase 3 years ago (a) and approximately 2 years later, a new lesion in segment 5 (b). Both were controlled with treated by repeated RFA and TACE (c, d). Arrow: ablated lesion. *: gallbladder.

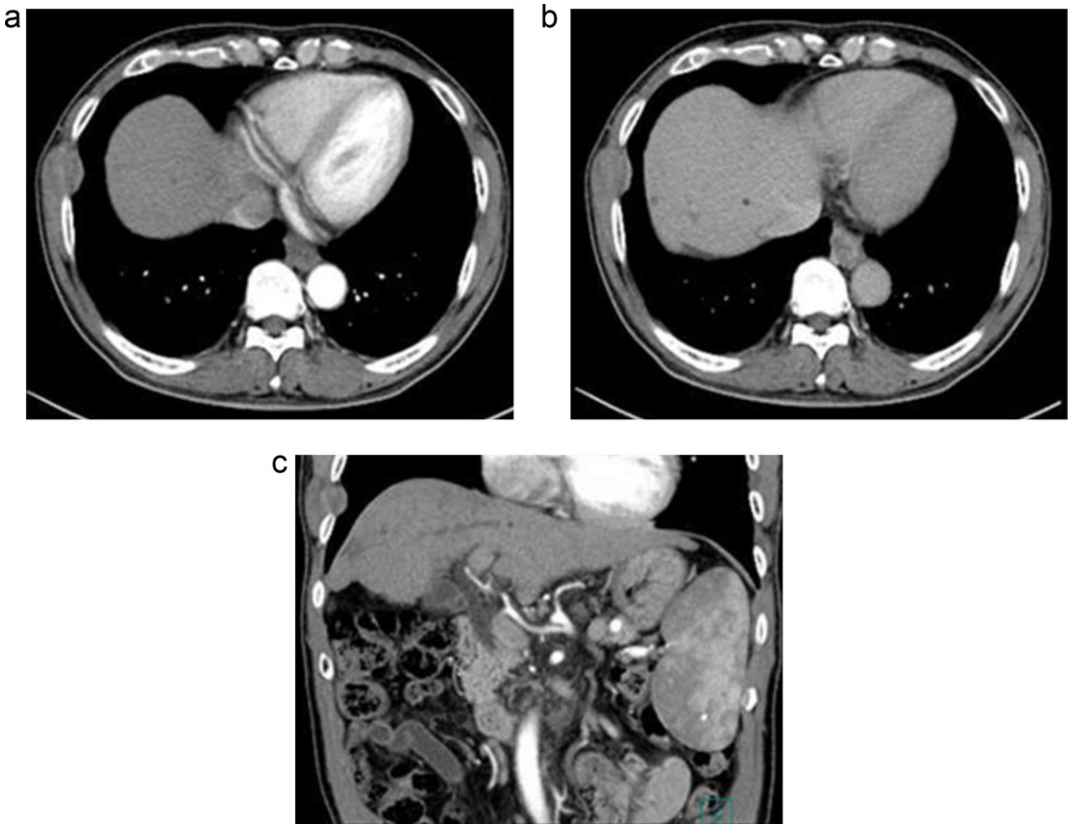

Fig. 2. Contrast-enhanced CT revealed a right chest wall mass that was heterogeneous and weakly enhanced in both early (arterial) (a, c) and late (b) phases.

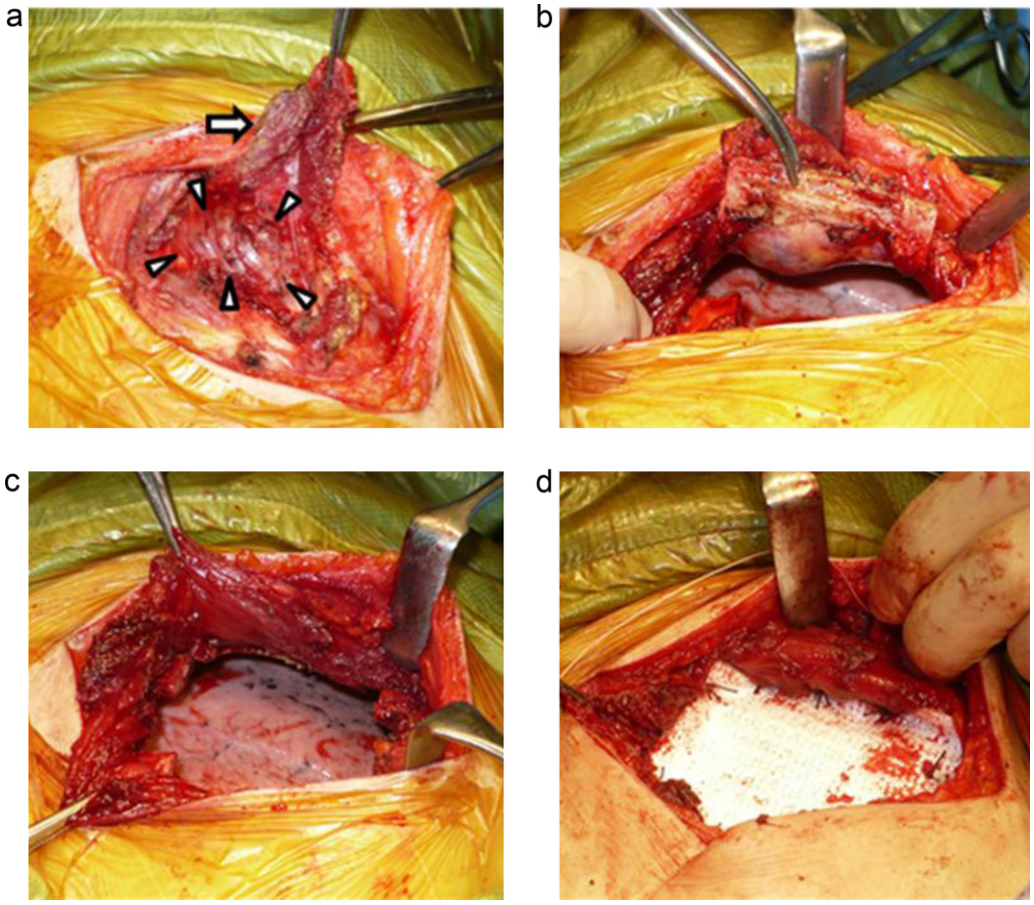

Fig. 3. A radical resection of the tumor along with a part of the adjacent 7th and 8th ribs was performed. The tumor (arrowheads) was solid and hard, and free from the serratus anterior muscle (arrow) (a), lung, or pleura (b). The 8 × 5 cm chest wall defect (c) was closed with a prolene mesh (d).

resection of the tumor along with a part of the adjacent 7th and 8th ribs to ensure a safety margin. The tumor was solid and hard, and the serratus anterior muscle, lung, and pleura were not involved. The 8 × 5 cm chest wall defect was closed with a prolene mesh (Fig. 3). The resected specimen was well encapsulated and measured 3.5 × 1.8 × 2.5 cm in size. The cut surface of the tumor was yellowish with septa (Fig. 4). Pathological examination revealed the presence of HCC in the intercostal muscle without infiltration into the surrounding bones. Cancer cells were observed in the vessels, suggesting that the tumor metastasized via a hematogenous route (Fig. 5). Postoperative serum AFP and PIVKA-II levels decreased to within the normal range. Ten months later, these tumor markers increased and intrahepatic recurrence was detected on CT. TACE was performed and both AFP and PIVKA-II levels decreased again. No other extrahepatic recurrence has been observed in the chest wall or elsewhere in the body for more than 20 months.

3. Discussion

HCC is an aggressive tumor, the treatment of which depends on the extent of its spread. Extrahepatic metastases of HCC are not rare, and have an incidence rate of 13.5–37%.[2–5] There is no consensus on the anticancer therapy that should be provided to patients with extrahepatic metastases of HCC. The algorithm for HCC therapy in the Clinical Practice Guidelines for Hepatocellular Carcinoma in The Japan Society of Hepatology 2009 update also does not suggest a clear recommendation for these patients. We present the case of a patient with intrahepatic tumors controlled by repeated RFA, whose metastatic chest wall tumor was successfully resected. Pathological examination revealed that the tumor was an intercostal muscle metastasis of the HCC.

The most common sites of extrahepatic involvement are the lungs, lymph nodes, bones, and adrenal glands, and the chest wall is a rare site of HCC metastasis; in a report by Katyal et al., only 6 of 148 HCC patients had extrahepatic lesions in chest wall.[2] A few cases of chest wall tumors have been defined as rib metastases from HCC[6,7]; however, it is very difficult to determine whether a chest wall metastatic tumor is muscular or osseous (rib) metastasis, especially when it is large. The present case is noteworthy because the intercostal muscle metastasis was clearly diagnosed.

Metastasis to intercostal muscles from malignant tumors is very rare, and only 1 case of metastasis of a squamous cell carcinoma from the uterine cervix has been reported.[8] An online search on PubMed using the keywords “hepatocellular carcinoma” and “intercostal (muscle) metastasis” showed that all intercostal muscle lesions were reported to be the result of disseminations through needle tracts from previous RFA therapy, percutaneous ethanol injection therapy, or biopsy for intrahepatic tumors, and to our knowledge, this is the first report of hematogenous metastasis of HCC to an intercostal muscle. Needle tract implantation due to RFA could be ruled out in this case because of the absence of pulmonary or pleural involvement and the clear existence of lung between the tumor and liver. Another possible origin of the tumor was ectopic liver tissue or a hepatoid adenocarcinoma; however, these were ruled out on the basis of the pathological findings. No normal liver tissue or adenocarcinoma was observed. Almost all ectopic HCC had no mother liver HCC,[9] which also suggested that the tumor in our case was different from the ectopic HCC.

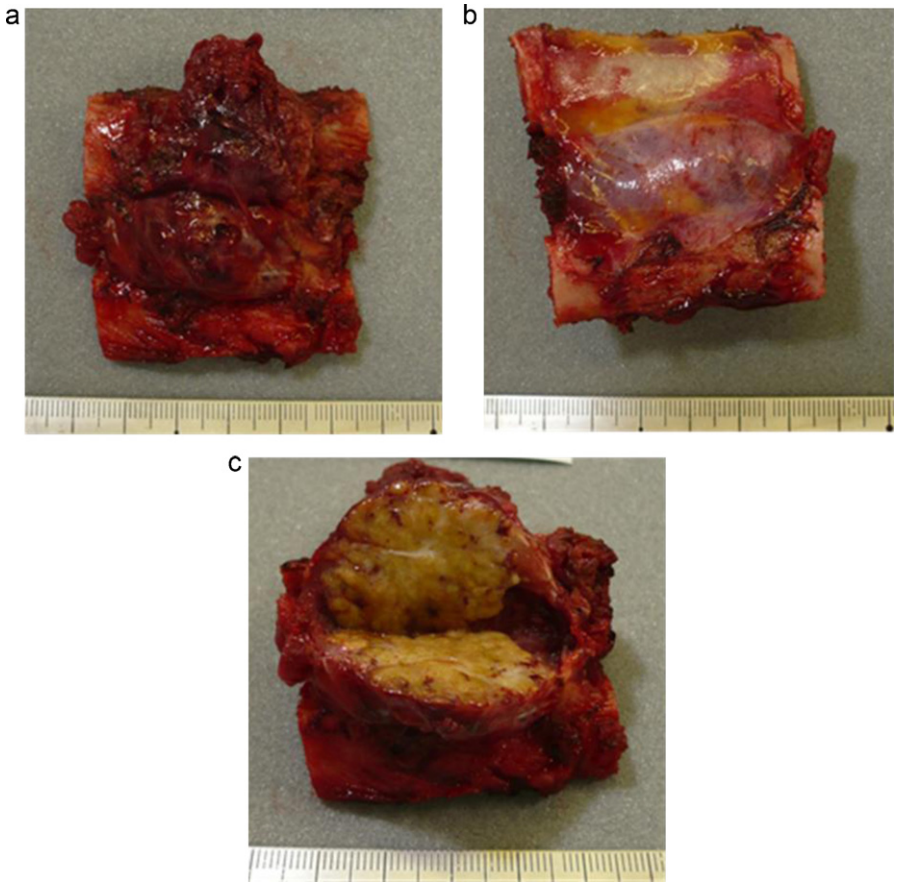

Fig. 4. The resected specimen was well encapsulated and measured of 3.5 × 1.8 × 2.5 cm in size (a). There was no apparent invasion to the pleura (b). The cut surface of the tumor was yellowish with septa (c).

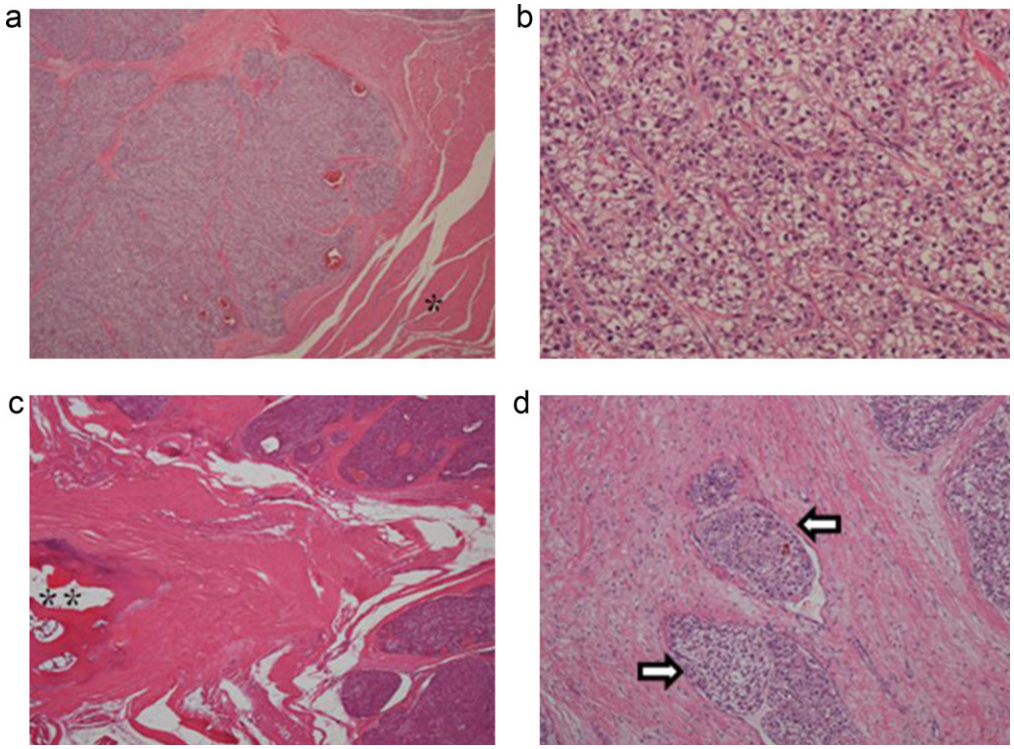

Fig. 5. Pathological examination revealed the presence of HCC in the intercostal muscle (*) (a, b) without infiltration into the surrounding bones (**) or involvement of collagen fiber (c). Cancer cell emboli (arrows) were observed in the vessels (d).

Skeletal muscle is also a rare site of HCC metastases, with a reported incidence rate of 0–1.5%.[3–5] This rarity, despite the abundant blood supply, may be attributed to the contractile properties of muscle, the local acidic environment resulting from the accumulation of lactic acid and other metabolites,[10] and the presence of tumor suppressors[11] or lymphocytes.[12] In previous reports, tumors that most frequently metastasized to skeletal muscle were of pulmonary origin,[13] and the skeletal muscles most frequently involved in metastasis were the diaphragm (67.8%) and the iliopsoas muscle (29.4%).[10]

Metastasis of HCC occurs through intrahepatic blood vessels, lymphatic permeation, or direct infiltration. Pathological examination of the resected tumor in our case showed apparent vascular cancer cell emboli; therefore, we speculated that the tumor cells reached the chest wall hematogenously.

When intensive therapies such as RFA and TACE result in remission of intrahepatic disease, surgical resection of extrahepatic metastases is the only means of controlling the disease and prolonging life, despite the availability of the multi-targeted kinase inhibitor, sorafenib. Although the resection rate of extrahepatic lesions is very low (2–6.4%),[3–5] the survival rates of patients who underwent surgical resection of extrahepatic metastases were significantly higher than those of patients who did not.[14] When only 1 or 2 extrahepatic tumors are present, surgical resection is beneficial for HCC patients who have good hepatic reserve, good performance status, controlled intrahepatic disease, and no portal vein invasion.[3,14]

We have reported here a rare skeletal muscle metastasis in the chest wall from HCC, which was surgically removed. Although the patient underwent another round of TACE for the intrahepatic recurrence after the resection, no other extrahepatic recurrence has been observed in the chest wall or elsewhere in the body for more than 20 months.

4. Conclusion

We report a case of skeletal intercostal muscle metastasis in the chest wall from HCC. This was a rare metastasis and could be surgically removed. The patient is alive without other extrahepatic recurrence for more than 20 months after the surgery.

Conflict of interest

None.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report.

Author contributions

KF has organized this work and written the manuscript. All authors reviewed the manuscript and approved the final version.

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